

CLAIMS

What is claimed is:

5 1. A capillary electrophoresis and electrochromatography matrix comprising a gel comprising one or more G-quartet forming nucleosides, oligonucleotides, or combinations thereof, wherein the gel comprises a monolithic form.

10 2. The matrix of claim 1, wherein the one or more G-quartet forming nucleosides, oligonucleotides, or combinations thereof are present on a microfluidics device.

 3. The matrix of claim 1, wherein the matrix further comprises an enzyme.

15 4. A capillary electrophoresis and electrochromatography matrix comprising beads embedded in a gel comprising one or more G-quartet forming nucleosides, oligonucleotides, or combinations thereof.

20 5. The matrix of claim 4, wherein the beads are chromatography packing beads.

 6. The matrix of claim 4, wherein the beads are functionalized.

25 7. The matrix of claim 6, wherein the beads are functionalized with a protein, an oligonucleotide, or a combination thereof.

 8. The matrix of claim 4, wherein the gel comprises a monolithic form.

30 9. The matrix of claim 4, wherein the one or more G-quartet forming nucleosides, oligonucleotides, or combinations thereof are present on a microfluidics device.

10. A capillary electrophoresis and electrochromatography column comprising a matrix comprising a gel comprising one or more G-quartet forming nucleosides, oligonucleotides, or combinations thereof and a support.

5 11. The column of claim 10, wherein the gel comprises a monolithic form.

12. The column of claim 10, wherein the matrix further comprises an enzyme.
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13. A method of isolating a target analyte from a mixture, the method comprising:

- 15 (a) contacting a mixture known or suspected to comprise a target analyte with a matrix comprising a gel comprising one or more G-quartet forming nucleosides, oligonucleotides, or combinations thereof; and
(b) eluting the target analyte from the matrix.

14. The method of claim 13, wherein the gel comprises a monolithic form.
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15. The method of claim 13, wherein the one or more G-quartet forming nucleosides, oligonucleotides, or combinations thereof are present on a microfluidics device.
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16. The method of claim 13, wherein the matrix comprises beads embedded in the gel comprising G-quartet forming nucleosides, oligonucleotides, or combinations thereof.

17. The method of claim 16, wherein the beads are chromatography packing beads.
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18. The method of claim 17, wherein the beads are functionalized.

19. The method of claim 18, wherein the beads are functionalized with a protein, an oligonucleotide, or a combination thereof.

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20. The method of claim 13, wherein the matrix further comprises an enzyme.

21. A method of detecting a target analyte in a mixture, the method comprising:

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(a) contacting a mixture known or suspected to comprise a target analyte with a matrix comprising a gel comprising one or more G-quartet forming nucleosides, oligonucleotides, or combinations thereof;

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(b) washing the matrix under conditions sufficient to remove non-specifically bound material; and

(c) detecting the target analyte bound to the matrix.

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22. The method of claim 21, wherein the target analyte is a nucleic acid present within the genome of a microbe.

23. The method of claim 21, wherein the gel comprises a monolithic form.

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24. The method of claim 21, wherein the matrix further comprises an enzyme.

25. The method of claim 21, further comprising lysing a cell that comprises the target analyte.

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26. The method of claim 21, wherein one or more G-quartet forming nucleosides, oligonucleotides, or combinations thereof are present on a microfluidics device.

5 27. A microfluidics device comprising one or more G-quartet forming nucleosides, oligonucleotides, or combinations thereof.

28. The device of claim 27, wherein the one or more G-quartet forming G-quartet forming nucleosides, oligonucleotides, or combinations thereof are disposed in a channel present on the device.
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29. A microfluidics system comprising a microfluidics device of claim 27.

15 30. A method of transporting a reagent on a microfluidics device, the method comprising:

- (a) providing a microfluidics device comprising one or more G-quartet forming nucleosides, oligonucleotides, or combinations thereof;
- 20 (b) contacting the microfluidics device with the reagent; and
- (c) applying a force to the microfluidics device to transport the reagent on the microfluidics device.

31. The method of claim 30, wherein the one or more G-quartet forming nucleosides, oligonucleotides, or combinations thereof are disposed in a channel present on the device.
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32. The method of claim 30, wherein the force is provided by a pump or by an electrical current.
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33. The method of claim 30, wherein the reagent is a nucleic acid molecule.